# 3 ways artificial intelligence can increase your revenue in 2025 ASRS Business of Retina Meeting 2025

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## **Financial Disclosures**

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### **Objectives**

- How deep-learning-based segmentation of OCT images can unlock commercial value of your datasets
- How AI can accelerate your clinical trial recruitment
- LLM for prior authorization

# #1 Segmentation/quantification

## Input: image

Output: quantification of specific biomarkers



Deep Learning-Based Prediction of Individual Geographic Atrophy Progression from a Single Baseline OCT

Julia Mai, MD, Dmitrii Lachinov, MSc, Gregor S. Reiter, PhD, Sophie Riedl, PhD, Christoph Grechenig, MD, Hrvoje Bogunović, PhD, Ursula Schmidt-Erfurth. MD

# Current limitations in ophthalmology big data

- Management and prognostication of retinal vascular diseases is heavily reliant on OCT images and associated biomarkers.
- EHR: demographics, VA, treatment regimen, ?CST
- CST only has moderate correlation with VA

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#### **OCT biomarkers**

- Type of fluid, amount of fluid, fluctuation of fluid
- How turbid/ hyper-reflective is the fluid
- Intraretinal hyperreflective foci
- Outer retinal tubulation
- Pigment epithelial detachment morphology, e.g. shape, height, volume
- EZ
- SRHM

### Why would pharma care/pay?

- Need more fine-grained data, beyond VA, to differentiate themselves from competitors and convince payors to skip step therapy
- Real world data: natural prevalence and progression of biomarkers, change in biomarkers in response to therapies
- Explore novel structural endpoints for therapies for earlier diseases

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## Why would pharma care/pay?

- Built in segmentation algorithms are rudimentary and very limited
- Manual segmentation is labor intensive and only feasible in a clinical trial/reading center setting, not for large-scale commercialization of imaging data







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### #2 Clinical trial recruitment

- Current limitations: time consuming, labor intensive, not comprehensive; requires manual identification of patients and then additional verification of images
- Needs integration of the EHR and imaging databases (IT infrastructure), automatic Al analysis of the images (real time or *a priori*) and an intuitive user interface (LLM)





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## #3 revenue cycle management (RCM)

- How providers bill for service and get paid by insurance payers? ~ 92% patients have insurance coverage
- RCM = \$156 billion market per year
- 12% claims denied; 65% of denied claims were never resubmitted
- Health systems are losing between to 1 to 5% of net revenue due to denied claims; average margin 4% in 2024 Q1

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### Why does front end of RCM matter?

- Eligibility and prior authorization (PA) issues are top denial reasons.
- PAs are complex, time-consuming, tedious and costly.
- PAs are often required in retina, e.g. intravitreal injections.
- Submission of PAs often require going through a payer portal online (50 to 60%), but each payer portal typically has its own interface and navigation.

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### **RPA vs. LLM**

About 50% of health systems have adopted some form of automation, mostly via robotic process automation (RPA).

RPA (legacy solution):

- explicit rules/instructions that have to be programmed ahead of time, e.g. a complex decision tree; cannot handle edge cases
- Brittle to payer portal interface change
- Not proficient with unstructured data, e.g. free clinical text

# LLM (cutting edge solution): - Proficient with unstructured data

- Adaptive; can be finetuned with reinforcement learning
- Great in understanding complex set of payer requirements and searching through lots of health records to find the right documents for PA

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#### Case study:

Pilot implementation of LLM-based process for prior authorizations at Johns Hopkins Medicine

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# LLM for prior authorization: lessons learned

Hopkins metrics during pilot:

Improved productivity by 25%

PA with all uploaded documents suggested by LLM: 71%

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## Thank you!

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